

REMARKS

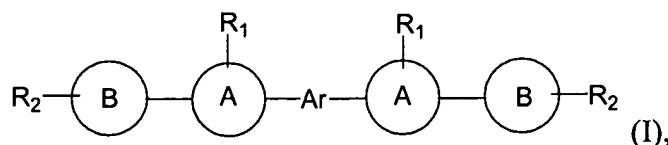
Applicants have amended claim 20 such that the scope of formula (I) recited in claim 20 is identical to the scope of formula (I) recited in claim 1. Applicants have also withdrawn claims 13-19 and 32-39, which are directed to non-elected species. Finally, Applicants have rectified minor deficiencies in the substitute Specification filed on January 13, 2004. Specifically, in the substitute Specification, Applicants inadvertently omitted a double bond in each of the two furan rings in compounds 1, 2, 4, and 5. Support for this amendment can be found on pages 3 and 4 of the original application filed on August 18, 2004. No new matter has been introduced by the above amendments.

Claims 1-12 and 20-31 are currently pending. Reconsideration of the application, as amended, is requested in view of the remarks below.

Claims 1-12

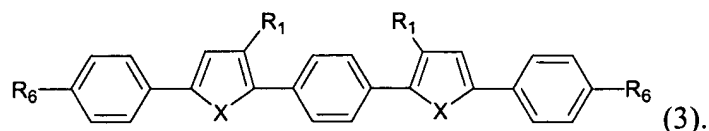
The Examiner rejects claims 1-12 under 35 U.S.C. § 103(a) as being obvious over Lee et al., J. Am. Chem. Soc., 122, p. 4992-4993 ("Lee"). See the Office Action, page 2, lines 15-16.

Independent claim 1 is discussed first. It covers a compound of formula (I):



in which Ar is aryl, heteroaryl, or oligoaryl; A is furyl; B is aryl or heteroaryl; R₁ is hydrogen, alkenyl, alkynyl, aryl, heteroaryl, cyclyl, heterocyclyl, or oligoaryl; and R₂ is hydrogen, alkyl, alkenyl, alkynyl, aryl, heteroaryl, cyclyl, or heterocyclyl.

The Examiner contends that Lee discloses compounds of formula (3) that would render claim 1 obvious. Applicants disagree. Formula (3) is reproduced below:



Lee discloses a one-pot synthesis of substituted furans and pyrroles from propargylic dithioacetals. It discloses only 5 compounds of formula (3), i.e., compounds 11a-11e. In these 5 compounds, R_1 is n-Bu when X is O or R_1 is Ph when X is N(Bu). Lee does not disclose or suggest compounds in which R_1 is Ph when X is O, compounds covered by claim 1. Indeed, referring to formula (I), claim 1 is limited to compounds in which R_1 can be aryl (e.g., Ph), but not alkyl, and ring A is furyl (i.e., X is O). In other words, Lee does not disclose or suggest any compound of claim 1. Thus, claim 1 is not rendered obvious by Lee.

Even if a *prima facie* case of obviousness has been made (which Applicants do not concede), it can be successfully rebutted by two unexpected advantages of the claimed compounds.

First, according to the present application, compounds 1 and 2 covered by claim 1 have much higher glass transition temperatures (T_g s) than compound 3, identical to compound 11a disclosed in Lee. See Table 1 of the Specification. More specifically, as shown in Table 1, compounds 1 and 2 have T_g s of 88°C and 96°C, respectively, which are 65-73°C higher than that of compound 3, i.e., 23°C.¹

Second, electroluminescence devices prepared from compounds 1 and 2 exhibited much higher maximal brightness than an electroluminescence device prepared from compound 3. See Table 2 of the Specification. More specifically, as shown in Table 2, Applicants prepared three electroluminescence devices, i.e., device 2, 4, and 5, that respectively contained compounds 1, 2, and 3 as a hole transporting material. Other components in devices 2, 4, and 5 were identical. The results showed that device 2 (containing compound 1) and device 4 (containing compound 2) have maximal brightness of 18,600 cd/m², and 16,100 cd/m², respectively, which are 7,100-9,600 cd/m² higher than that of device 5 (containing compound 3), i.e., 9,000 cd/m².

Given these two unexpected advantages, the compounds of claim 1 are clearly not obvious over compound 11a disclosed in Lee (i.e., compound 3 disclosed in the present application). Indeed, in view of Lee, one skilled in the art would not have been motivated to modify compound 11a to arrive at the compounds of claim 1.

¹ Electroluminescence devices prepared from compounds with high T_g s are generally more stable than those prepared from compounds with low T_g s.

For the reasons set forth above, claim 1 is not rendered obvious by Lee. Neither are claims 2-12, all of which depend from claim 1.

Claims 20-31

The Examiner rejects claims 20-31 under U.S.C. § 103(a) as being obvious over Mori et al., U.S. Patent 5,281,489 ("Mori") in view of Lee. See the Office Action, page 3, lines 8-9.

Independent claim 20, as amended, covers an electroluminescence device that includes an anode layer, a hole transporting layer, an electron transporting layer, and a cathode layer, in which the anode layer, the hole transporting layer, the electron transporting layer, and the cathode layer are disposed in the above order. The hole transporting layer includes a compound of formula (I), in which Ar is aryl, heteroaryl, or oligoaryl; A is furyl; B is aryl or heteroaryl; R₁ is hydrogen, alkenyl, alkynyl, aryl, heteroaryl, cyclyl, heterocyclyl, or oligoaryl; and R₂ is hydrogen, alkyl, alkenyl, alkynyl, aryl, heteroaryl, cyclyl, or heterocyclyl.

The Examiner contends that "[i]t would have been obvious to one of ordinary skill in the art at the time of the invention to have used the luminescent compound according to formula (3) taught by Lee et al., in the luminescent layer of the luminescent device taught by Mori et al., because Mori et al. teaches luminescent agents are desired for the luminescent layer of the device." See the Office Action, page 4, lines 6-10. Applicants disagree.

Mori discloses an electroluminescent element containing an anode, a cathode, and an organic luminescent layer having a luminescent agent. See the Abstract. It does not disclose or suggest any compounds of formula (I) recited in amended claim 20. Lee does not cure the deficiency in Mori. Indeed, as discussed above, Lee also does not disclose or suggest any compounds of formula (I) recited in amended claim 20. Thus, claim 20 is not rendered obvious by Mori in view of Lee. Even if a *prima facie* case of obviousness has been made (which Applicants do not concede), it can still be successfully rebutted by the above-discussed two unexpected advantages of the compounds of formula (I) recited in claim 20.

For the reasons set forth above, claim 20 is not rendered obvious by Mori in view of Lee. Neither are claims 21-31, all of which depend from claim 20.

Applicant : Tien-Yau Luh et al
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CONCLUSION

Applicants submit that the grounds for rejection asserted by the Examiner have been overcome, and that claims 1-12 and 20-31, as pending, define subject matter that is non-obvious. On this basis, it is submitted that all claims are now in condition for allowance, an action of which is requested.

Please apply any other charges to deposit account 06-1050, referencing Attorney's Docket No.: 08919-082001.

Respectfully submitted,

Date: 5-10-05

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